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Flexitarianism (Flexible or Part-Time Vegetarianism): A User-Based Dietary Choice for Improved Wellbeing

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ABSTRACT

Many think that eating meat is nutritionally necessary and beneficial. Industrialising livestock production provides meat that is often “cheaper” than fruit and vegetables. In reality, this has come at a cost for human, animal and ecological welfare. Western mainstream meat consumption is a leading cause of increasing ill-health, diabetes, cancers, non-communicable and chronic diseases, malnourishment, obesity, antibiotic resistance, spread of infectious diseases, hunger and possible global epidemics as well as climate change, biodiversity loss, water and land degradation. Rather than stop this, vested interests continue to promote meat consumption. If people are deliberately misinformed or have no access to reliable information, what chance do they have to make the right food choices? This paper outlines flexitarianism (flexible vegetarianism) as a personal user-driven opportunity to combat the geopolitical and industrial duplicity about meat. Consumers should have enough information about the implications of their nutritional choices. In addition to health benefits, flexitarianism can help mitigate climate change, environmental and social destruction and reduce animal suffering. The proposed information policy interventions are assessed against their impact on key stakeholders and overall value for public health and environmental wellbeing. They offer an opportunity to reclaim personal health and improve the health of the planet.

Keywords: Diet, Environment, Flexitarianism, Health, Information, Meat, Policy, Sustainable

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INTRODUCTION

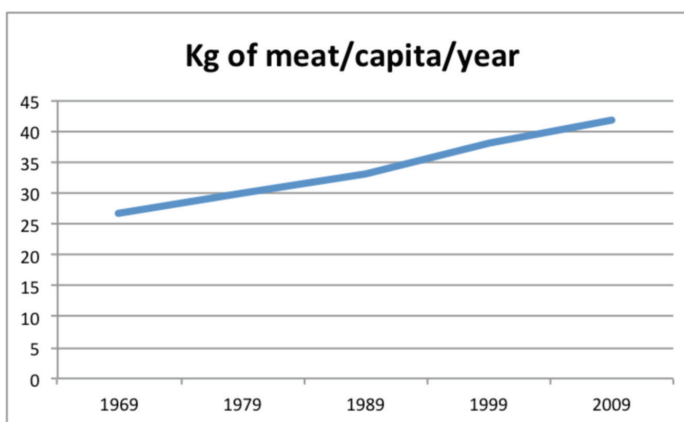
In the last four decades, meat production and consumption have significantly exceeded population growth. While population numbers have almost doubled, global meat production has tripled during this period with an increase of 20% in just the last ten years (Wordwatch Institute, 2013). Overall, supply of meat per person per year has been on a steady upward trend (see Figure 1).

In contemporary society, meat (unprocessed and processed red meat—beef, veal, pork and lamb, and poultry) has become accessible for billions of people and is often cheaper to buy than fruit and vegetables. Yet this increasing affordability has a cost for the overall wellbeing of people and the planet. This is felt differently in countries with greater or lesser food choices and the challenges for the developed and developing world are not the same. Various factors, including social and religious considerations, access to arable land, farming practices and production opportunities, are all having an impact on food choices. In the currently dominating model of development, the

Western meat-rich diet is promoted as a better dietary option despite the growing evidence to the contrary.

Drawing on publicly available data and building on previous academic work, this paper offers some perspectives on the human and environmental consequences of current western meat consumption patterns. The sectors associated with meat production, including the livestock and pharmaceutical industries, have influenced many healthcare related areas within society affecting health-care practices and recommendations, government dietary and health recommendations, academic research and food politics. This paper, through the promotion of user-based reduction in meat consumption, invites people to rethink their personal dietary choices arguing that this could improve individual health while at the same time benefiting the society and the planet. The “users” this paper targets are multiple actors, including lay individuals, professionals, policy makers and also “health professionals as well as patients and anyone who uses the web with a user name” (Biswas & Martin, 2011: ii)

Figure 1. Meat consumption per capita per year [kg]. Source of data: <http://faostat.fao.org/site/610/DesktopDefault.aspx?PageID=610#ancor> (accessed 1 July 2013).



We examine the direct and indirect impacts on human and ecological health of diets based on excessive meat consumption and explain that many consumers may have been misinformed about their nutritional choices. Flexitarianism (flexible or part-time vegetarianism) is offered as an alternative, personal and user-driven opportunity to improve individual health and planetary wellbeing. We define flexitarianism as *voluntarily reduction in excessive meat consumption*. This reduction can be anywhere between the actual person's meat consumption and the level recommended by the World Health Organisation (WHO). A flexitarian acknowledges that excessive meat consumption is harmful for human health and also for the environment and the planet, and therefore chooses a diet which is healthier and more sustainable. An avenue to approach this is through informing individuals about the implications of their food choices. In the last section, we outline and assess information strategies to combat the widespread misrepresentation about the value of meat. They can potentially improve the average health status of populations, decrease health inequalities and improve the planetary wellbeing.

Meat and Health

While some people may believe eating meat is nutritionally necessary and generally beneficial, an increasing number of studies are showing that excessive production and consumption of meat are adversely affecting human wellbeing. Direct human health implications now associated with meat include increased nutrition-related illness (such as cancer, diabetes type 2 and obesity), antimicrobial resistance (i.e. resistance of microorganisms to antimicrobial medicines to which they were previously sensitive (WHO, 2012)), spread of global pathogens (such as SARS and swine flu) and mental health outcomes linked to meat production. Indirect meat-related human health impacts include the consequences of anthropogenic climate change, water and land pollution by the livestock sector, loss of biodiversity as a source for potential

medical cures and threats to food security due to impaired ecosystem services. These are discussed below.

Nutrition-Related Illness

A 2011 update by the World Cancer Research Fund clearly recommends people should limit red meat intake to no more than 500g per week and the report calls for complete avoidance of processed meat (bacon, ham, salami, sausages, deli meats and some burgers) (WCRF, 2011a). There is ample and growing scientific evidence confirming the correlation between increasing meat consumption and a wide range of escalating nutrition-related non-communicable and serious diseases, including cancer. Research outcomes from reputable international health organisations, such as the World Cancer Research Foundation (WCRF), the World Health Organisation's International Agency for Research on Cancer (IARC), the European Prospective Investigation into Cancer and Nutrition (EPIC) and the American Institute for Cancer Research (AICR), confirm the negative connection between the consumption of red and processed meat and various cancers, particularly bowel cancer (Groenen et al., 1976; Riboli & Lambert, 2002; Jakszyn & González, 2006; WCRF/AICR, 2007; AICR, 2010; Ferlay et al., 2010; WCRF, 2011a; AICR, 2012). These and other studies also conclusively link cancers of the oesophagus, liver, lung, stomach, bladder and prostate to red and processed meat consumption (Cross et al., 2007, 2011; Ferrucci, 2010).

Increasing meat consumption is implicated as a major factor for rising rates of debilitating, potentially life-threatening illnesses and costly diseases, such as obesity, hypertension, diabetes, heart disease, stroke, cancers, rheumatoid arthritis, multiple sclerosis, lupus, gallstones, atherosclerosis, diverticulitis, food-borne illnesses, osteoporosis, immune system disorders, allergies and asthma (Appleby, 1999; Monday, 1999; Gardner & Halweil, 2000; Popkin, 2001, 2009; WHO, 2003; LEAD, 2006; Cross et al., 2007; Fox, 2007; WCRF/AICR, 2007; Moritz, 2009; Henning, 2011; Stone, 2011; USDA,

2011; WCRF, 2011a, WCRF, 2011b; Ornish, 2012). It is also understood to be responsible for severe but less threatening health conditions, such as constipation and bowel problems, and the related negative consequences on psychological and physical wellbeing particularly in children who are eating insufficient quantities of plant-based fibers.

Meat consumption in traditional or impoverished societies, where there are limited or no food options, may be necessary for survival. However, in more affluent communities there is abundance of alternatives and, in light of the research evidence, a predominantly meat-based diet should no longer be promoted as a wise nutritional option. Despite the fact that prolonged western life spans can in part be traced to increases in food security, “about 80 percent of elderly people (over age 65) suffer from at least one chronic disease and about 50 percent suffer from two or more chronic diseases...” largely attributed to excessive meat consumption (Barilla Center, 2012:239). The publicising of the benefits of eating meat has encouraged unhealthy levels of consumption resulting in an increasingly unhealthy western population and a disturbing prophecy that today’s children may not outlive their parents (Stone, 2011). Paradoxically, this negative health trajectory is preventable. If individuals are made aware of the risks associated with excessive meat consumption, they may be in a better position to protect themselves from misleading messages.

Due to the global influence of western life styles, people climbing out of poverty (for example, in emerging economies such as India, Brazil and China) are changing their traditional diets of grains, vegetables pulses, roots and tubers to high meat consumption. Consequently nutrition-related non-communicable diseases (NCDs) are overtaking communicable disease (Goodland, 2001; Stamoulis et al., 2004; Karelina & Fritschel, 2011). For instance, the rate of increase of global cancer is now more than four times faster than the spread of HIV (WCRF, 2011a and b). The World Health Organisation’s policies are explicitly now targeting the “double burden of malnutrition (i.e. undernutrition,

and obesity and diet-related NCDs)” (WHO, 2013:15). In a similar vein, FAO (2013:v) recognises that the “challenge for the global community...is to continue fighting hunger and undernutrition while preventing or reversing the emergence of obesity”.

Food that has potential harmful effects should not be promoted as a healthy option without any caveats. People should “have access to a diverse range of nutritious foods and to the knowledge and information they need to make healthy choices” (FAO, 2013:v). While it can reasonably be expected that government and health institutions should protect and inform the public, this does not seem to be the case as far as meat consumption is concerned and it is increasingly evident that the global food agenda is managed by vested interests (Raphaely and Marinova, 2012). Accordingly, the onus is on the individuals to access the necessary information needed to take care of themselves and their loved ones.

Antimicrobial Resistance

Industrialised factory meat production also poses serious threats to human health and again consumers seem largely unaware of these dangers (Nestle, 2007). The use of antibiotics, growth hormones and genetic modifications has facilitated cheap mass meat production. Industrialised farms routinely administer sub-therapeutic doses of antibiotics to animals to counter their compromised immunity caused by unsanitary breeding and living conditions. Such use of antibiotics maintains high productivity, increased growth rates and weight gain but is also known to be exacerbating a global “epidemic” of antibiotic resistant infections (Spellberg et al., 2008; Chee-Sanford et al., 2009; Price et al., 2012).

As early as 1969, the Swann Report, presented to the British parliament, concluded that non-therapeutic administration of antimicrobials to food-producing animals resulted in a dramatic increase of bacteria resistance which posed a significant risk to human and animal health and recommended more prudent use

(Swann Report cited in FDA, 2010:5). In 1997, a World Health Organisation (WHO, 1997) study reported that all use of antimicrobials, including antibiotics, disinfectants, antivirals, antifungals and antiparasitics, leads to the selection of resistant forms of bacteria and other microorganisms. Moreover, such “low-level, long term exposure... may have greater selective potential than short-term, full dose therapeutic use” (WHO, 1997:5). Consequently, WHO called for termination of the use for food animals of all antimicrobials used for humans. In 2004, the United States Government Accountability Office (GAO cited in FDA, 2010:11) confirmed that antibiotic-resistant bacteria have been transferred from animals to humans and that animals were the source of human infection. It further warned that “this transference poses significant risks for human health” (GAO cited in FDA, 2010:11). In response to the GAO and 11 other supporting studies, the US Department of Health and Human Services (HHS) stated that there is “significant and growing evidence demonstrating the human health consequences of drug resistant infections related to antibiotic use... We believe that there is a preponderance of evidence that the use of antimicrobials in food-producing animals has adverse human consequences... There is little evidence to the contrary” (HHS cited in FDA, 2010:12).

The world’s medical community has been calling for controlled and responsible use of antibiotics in human medicine in order to delay microbial resistance and adaption; yet over half of all antibiotics produced worldwide are now administered non-therapeutically to meat-animals (Steinfeld et al., 2006:273). Limiting antibiotic use in humans to mitigate antimicrobial resistance may not be effective when the overwhelming majority of antibiotics used worldwide are given to livestock.

By contributing to the spread of antimicrobial resistant infections and infectious diseases, the mass production and overconsumption of meat now constitute one of the single greatest threats to public health (Henning, 2011:66). Despite the conclusive evidence and numerous calls from reputable national and international

health bodies for restricted use or a ban, none have occurred to date. It appears that the global alliance of concerned public-health organisations and individuals do not have enough influence to illuminate, prevent or halt the existing antibiotic use and practices in meat production.

Antibiotic resistance also has indirect consequences and health services would be very different without reliable effective medicaments. For example, elective surgery and other invasive interventions would become problematic. While billions of meat animals are kept “healthy” in unhealthy industrial farms, the world’s population faces a possible prospect of losing antibiotics as a tool to treat and prevent human illness (Safran Foer, 2009). This is one of the many true costs to human health of cheap and abundant meat.

Global Pathogens

Breeding genetically modified, uniform, antibiotic-maintained animals in overcrowded, stressful, faeces-infested, artificially lit conditions creates an environment for development and propagation of pathogens. These mass production meat facilities are now understood to be responsible for rapid selection and amplification of pathogens as well as an increasing risk for disease entrance and/or dissemination. It was in industrial farms that scientists saw, for the first time, viruses that combined genetic material from bird, pig and human viruses. Columbia and Princeton University scientists have traced 6/8 genetic segments of one of the most feared viruses directly to US industrial farms (Safran Foer, 2009). The H1N1 swine flu outbreak originated at a large-scale hog farm in North Carolina and spread throughout the Americas and the world (Safran Foer, 2009; Nordgren, 2011).

Again, this raises serious questions about how food that compromises the health and well-being of individuals, local and global communities is being promoted as a nutritional option (Safran Foer, 2009). While ordinary citizens around the world rightfully believe governments and health related agencies have responsibilities

in the name of the common good, it seems that in the case of meat consumption, consumers are left to unearth the nutritional and health facts on their own.

Mental Health

According to Halweil (2008:2), 650 animals are killed every second of every day for food consumption. In human societies, crimes of abuse and aggression against the vulnerable, e.g. the young or the old, are considered to be the most heinous of acts. In slaughterhouses and industrial farms, the same acts of indifference, malevolence, cruelty, brutality and lack of compassion are legally practised, socially acceptable, necessary and financially rewarded.

It stands to reason that in order to perform these violent tasks (prohibited in society yet sanctioned within the walls of industrial farms and slaughterhouses), people employed in the livestock industry must become desensitised. Numerous studies show the link between meat production and consumption and violent behaviour in society (Hamilton, 2006; Singer and Mason, 2006; Safran Foer, 2009). Such anthroparchy and indifference to what happens to sentient beings during meat production is morally detrimental: “(r)elations to one’s self and to others are altered, and the relation to death is ‘pathologised’” (Porcher, 2006:e56). For example, the quantitative findings of Fitzgerald et al. (2009:158) “indicate that slaughterhouse employment increases total arrest rates, arrests for violent crimes, arrests for rape, and arrests for other sex offenses in comparison with other industries”. This suggests a sociology of violence unique to the workplace of industrial farms and slaughterhouses. The authors conclude these conditions are very different to any other industrial production processes as they result in a growing list of mental health and related social problems caused by the little understood social role of animals. Being informed about the societal mental health pathology associated with meat production, should enable all members of

society to make personal nutritional decisions that are more conducive to individual and collective human wellbeing.

Climate Change

Anthropogenic climate change is considered to be one of the biggest environmental crises in human history (Gold, 2004:4) and indirectly the biggest global health threat of the 21st century (The Lancet, 2009). The livestock sector is the largest contributor of global anthropogenic Greenhouse Gas (GHG) emissions and based on widely-used rules of GHG accounting, is responsible for 51% of all worldwide emissions (Goodland & Anhang, 2009; Pelletier & Tyedmers, 2010). Predictions are that by 2050 the livestock sector will singlehandedly account for 72% of the total “safe operating space” for human-caused GHG emissions, 88% of the safe operating space for biomass use and as much as 300% of the safe operating space for reactive nitrogen mobilisation (Pelletier & Tyedmers, 2010). This alone will bring irreversible changes irrespective of any technological methods of addressing climate change. Simply stated, the direct and indirect financial and physical impacts of livestock-induced climate change on the world and human health are unprecedented.

Reduction in meat consumption consequently offers an immediate, accessible and effective opportunity to mitigate climate change and its negative health impacts (Goodland & Anhang, 2010a, b and c; Raphaely & Marinova, 2012). Changing weather patterns, increased weather extremes and varying spatial distribution of temperature, precipitation, humidity, air and water currents are already disrupting existing livelihoods (Min et al., 2001; Pall et al., 2011; Dummer et al., 2011). The next five years are likely to be the world’s last chance to combat this threat before projected climate, and resulting health disruption, become irreversible (IEA, 2011; The Climate Institute, 2011). Yet, misrepresentation and concealed information regarding the true costs of cheap meat produc-

tion and consumption are ensuring individuals are prevented from choosing the opportunity to act or participate in mitigating greenhouse gas emissions.

Climate change impacts on human health (see Figure 2) are already far-reaching and are likely to continue to increase in scale and intensity. Impacted pathways include water availability, extreme weather and other natural events, loss of eco-system services (especially the consequences on food security), communicable disease transmission and social disruption caused by migration, displacement and conflict over resources. Direct consequences include: fatalities and injuries from extreme weather events, such as floods, famine, droughts, fire, diarrheal illness, foodborne and vector-borne diseases (e.g. malaria, encephalitis and dengue fever), heat exhaustion, heat stroke, increased zoonotic risks from heat-stressed livestock and pathogen multiplication and survival, reduction in sanitation and hygiene related illnesses, increasing aeroallergens and air pollution (McMichael, 2003; 2012; Huq et al., 2007; McMichael et al., 2007; Kovats & Hajat, 2008; Berry et al., 2010).

The effect of climate change on mental health (The Climate Institute, 2011) is already manifested through at least three pathways: firstly, through inflicting more and worse natural disasters on human settlements causing serious anxiety-related responses, chronic and severe mental health problems; secondly, through increasing the risk of injury and physical health problems causally and reciprocally related to mental health; and thirdly, through endangering the natural and social environment on which people depend for their livelihoods (Berry et al., 2010: 129). Felt by everyone, these effects “will fall disproportionately on those who are already vulnerable, especially on indigenous peoples and those living in developing countries, which will bear the brunt of adverse climate change” (Berry et al., 2010: 129). People are yet to be given the necessary information to understand and acknowledge the

large contribution excessive meat consumption has on affecting the pathways leading to these bleak health related projections.

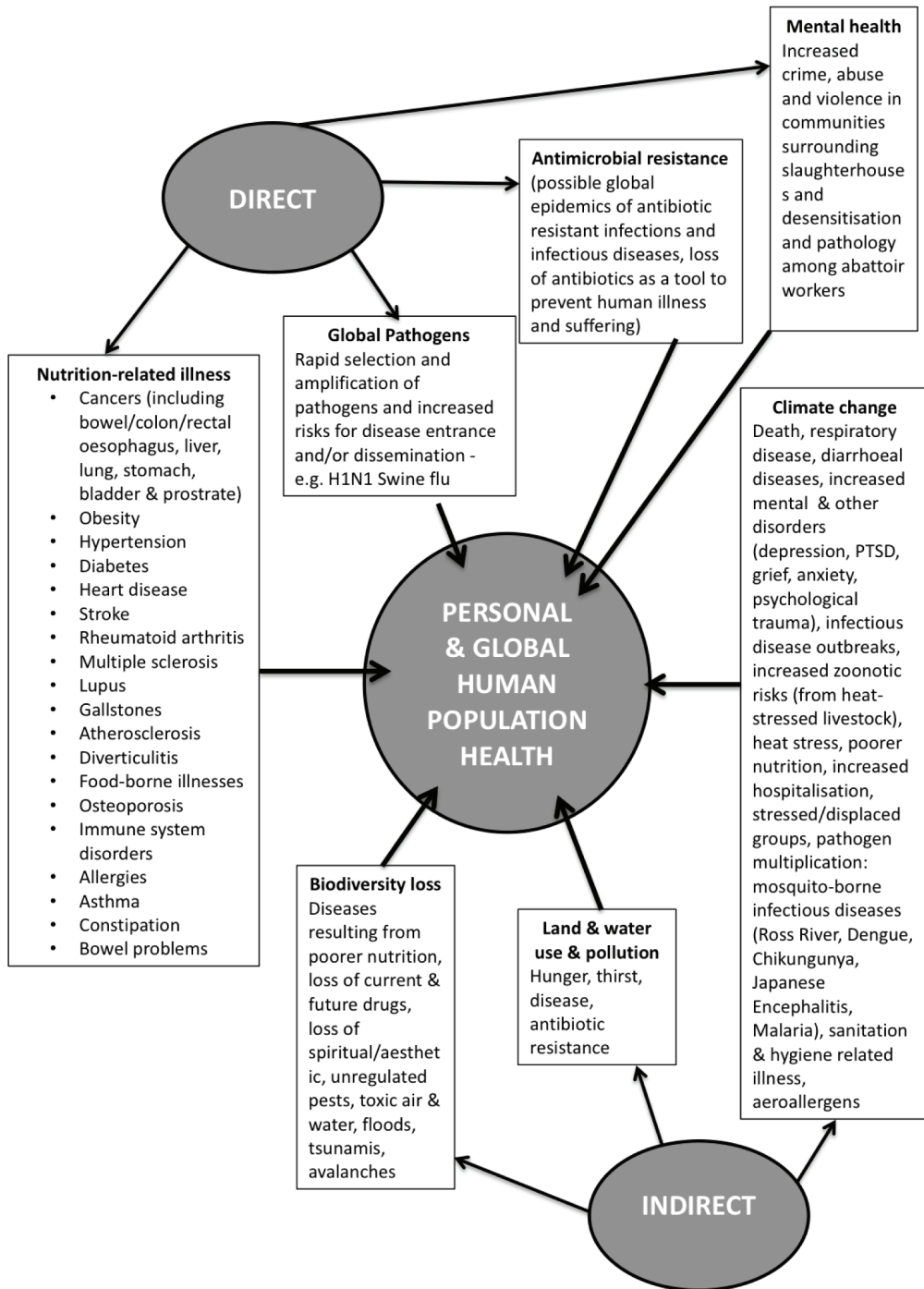
Land and Water

The livestock sector is the single largest anthropogenic user of land. At least 26% of the world's ice-free, terrestrial surface is occupied by grazing, 33% of all arable land is dedicated to feed-crop production and in all, livestock production accounts for 70% of all agricultural land use and uses 30% of the land surface of the planet (FAO, 2006; Pachauri, 2008). The ecological impacts of such land use are costly, particularly because at current consumption levels, the human population is already reaching the earth's carrying capacity. With the predicted livestock and human population growth figures, it will not be possible to provide enough food to sustain humanity or the animals it consumes (Smail, 2004). For example, 90% of the globally grown soya is used to feed meat animals instead of people (FAO, 2006). Consuming meat is a highly inefficient conversion of protein and consequently a questionable use of land for the production of food for a growing world population which faces hunger and food shortages (Raphaely & Marinova, 2012).

Clearing and cultivation of land for pasture or feed crops are also of significant concern (Henning, 2011:72) as these cause desertification, decreased vegetation, reduction of available water, reduction of crop yields, increased salinity and soil erosion (IPCC, 2007) as well as facilitate invasion by alien species. The quality of the land used for meat animals is significantly compromised or destroyed as a habitat or natural resource for alternative purposes. Such inefficient use and resulting degradation may be largely prevented through user-based actions when these facts are made transparent.

The impacts keep coming. According to the Food and Agriculture Organisation of the United Nations (FAO, 2006), 64% of the world's population will live in water-stressed areas by 2025. Although human population

Figure 2. Direct and indirect health impacts of meat production and consumption



growth has an impact on this expected water shortage, the livestock sector's key role in depletion and degradation of freshwater supplies is often downplayed (Henning, 2011: 70). "Domestic" water use accounts for 10% of freshwater consumption while agriculture accounts for around 70% (FAO, 2006). Hidden in this high percentage of water use by agriculture is the amount dedicated to livestock. For example 1kg of beef requires around 100,000l of freshwater which is 100 times more than the amount needed to produce 1kg of grain protein for human consumption (Pimentel & Pimentel, 2003; Millston & Lang, 2003).

The negative implications of livestock production on water extend beyond the inefficient use of an increasingly scarce resource, but also affect the replenishment and quality of these freshwater stocks. The meat industry is the largest single sectoral source of water pollution (FAO, 2006). Animal wastes (containing antibiotics and hormones), chemicals from tanneries, fertilisers and pesticides used for feed crops together with sediments from eroded pastures contribute for eutrophication or "dead zones" in fresh and marine water bodies. Such pollution further weakens stressed marine ecosystems such as coral reefs, exacerbates human health problems due to polluted water, causes compounding antibiotic resistance and has also been responsible for massive fish kills (FAO, 2006; Henning, 2011). Slaughterhouse and waste lagoons, which can be 20 acres large and feet deep (Schlosser & Wilson, 2006: 166) often break, leak or overflow, polluting underground water supplies and rivers with nitrogen and phosphorus compounds, including nitrates. All of these pose serious health risks, but information is rarely easy to find and people lack the necessary awareness that might prompt them to search for the facts.

In a world with fragile marine ecosystems and increasingly limited water resources, raising and consuming animals in the western way create dangers that in the short, medium and longer term will prove to outweigh any benefits. "Indeed, given that eating meat is nutritionally unnecessary and detracts more from the global

supply of food than it provides, not only is the inefficient and wasteful use of increasingly scarce freshwater ecologically unsustainable, it is morally unacceptable to continue to preference the acquired taste of meat over the need for life-giving freshwater" (Henning, 2011: 71). As populations in water scarce regions continue to grow, governments and health authorities could cut these deficits by shifting water to grow food for people not livestock in order to safeguard public health. To date there is little indication of this happening; however the informed individual can take a personal stance.

Biodiversity

The impacts of industrial livestock production on ecosystems and species are equally severe and unsustainable for human health. Forests contain 80% of the world's terrestrial species. They provide a range of essential ecological functions, including: a vital source of global oxygen supply, moderating climates, preventing floods, defending against soil erosion, recycling and purifying water, offering habitat for flora and fauna and providing housing, wood and cooking fuel. In addition, they embody beauty, inspiration and solace. Yet the worldwide rate of deforestation for pastureland annually exceeds more than 13 million hectares, an area the size of Greece or Nicaragua (UNEP, 2003), and is contributing to an unprecedented, rapid reduction in biodiversity.

In the face of increasing human health challenges, biodiversity is the basis for resilience (CBD, 2011). With only 1% of tropical rainforests tested for medicinal benefits, they already supply 25% of all medicines and researchers believe that these ecosystems contain the medicines of the future (Sussman, 2000: 67; Gore, 1993: 23). Over half (~60%) of all medicines used today are sourced from nature, including drugs such as aspirin and quinine (Rose, 2009). According to Bernstein (2010:n.p.), "two thirds of all new drugs licensed in the US from 1981-2006 would not exist if they hadn't been found in or patterned after compounds that nature designed. This proportion is yet higher

for cancer drugs and antibiotics.” Biodiversity is a source of current and future drugs; fulfils spiritual and aesthetic needs and is essential for sustaining life on earth. Clearly, excessive meat production and consumption, by contributing so significantly to deforestation and loss of biodiversity, are creating a yet unquantified, but serious direct and indirect threat to human life.

Despite all the existing evidence regarding its negative impacts on human health, excessive meat consumption continues to be supported and promoted through formal nutrition and health public channels and in official guidelines. The consequence is a global trend of expanding meat consumption. As Bittman (2012:n.p.) succinctly summarises: “on the world scale there’s troubling movement in the wrong direction”.

Misinformation about Meat

The currently disseminated information can be held largely responsible for the unsafe trajectories discussed to this point. It is therefore interesting to briefly explore the origins and consequences of the vested interests of political and industry stakeholders supporting the global livestock sector. It is a complex task to disentangle all relationships and channels of influence, but for the purpose of this analysis we arbitrarily look at some examples of political influence, regulations and subsidies, health research, practice and nutritional guidance and homogenisation of diets.

Political Influence

The links between the goals of trade and industry facilitation and the protection of public health are very blurred at a national and global level (Dixon et al., 2007). Public interests may be directly affected through this lack of transparency about political priorities. For example, the United States Department of Agriculture (USDA) was originally established with the dual mandate of supporting and promoting farmer and agricultural interests while at the same time advocating consumer interests by setting nutrition standards and food assistance

programs. The double mandate created an inherent conflict of interest that allowed the meat and supportive industries (such as pharmaceuticals) to wield considerable political and economic influence over USDA and other government policies (Simon, n.d; Safran Foer, 2009). This power has been consolidated over the years and the USDA is now credited with having the greatest global influence on nutrition and nutritional choices due to its role in setting dietary directions. In Australia the situation is no different with the Meat and Livestock Association (MLA) contributing to the funding of prestigious government research organisations, including the Commonwealth Scientific and Industrial Research Organisation (CSIRO) (Russel, 2009).

On a global stage, in response to the increasing scientific evidence about the numerous negative impacts of excessive meat production and consumption, a partnership was announced at the World Meat Congress (June 2012) between the International Meat Secretariat and FAO. Its task is to establish global standards to assess the GHG generated by livestock production (The Meat Site, 2012). According to Nestle (1999), in the name of profit maximisation, the livestock industry and related stakeholders will do the necessary to continue producing and promoting meat products, including lobbying politicians, co-opting government food and nutrition experts and supporting professional and public organisations and research bodies. For example, in Australia the livestock sector is exempted from the carbon tax despite being recognised as one of the major GHG emitters.

Yet again, it should be apparent that while citizens around the world rightfully believe that governments and related agencies have been established and are responsible for policing in the name of the common good, thanks to the political and economic influence of the global meat megamachine, this is not the case. National governments (e.g. in Australia Department of Agriculture and Food, 2012) and international organisations (such as the European Union) support farmers through policies that result

in transfers of taxpayers' money to producers. This government support needs justification which is reflected in most public information promoting meat production and consumption.

Subsidies and Regulations

Subsidies to the livestock industry were originally intended to be a temporary fix to save farms in the 1930s following the hardships of the Great Depression (e.g. the New Deal in the USA, Schlesinger, 2003). At the time farmers accounted for large sections of the population (e.g. 25% in the US) and were in need of financial assistance. Due to rapid industrialisation and urbanisation, today's farmers account for 1% of the population and during good years earn well above national averages (Bernanke, 1983). However, governments continue to give ongoing farm subsidies which artificially keep meat prices low, encouraging excessive meat-based diets particularly for the socio-economically disadvantaged (Fox, 2007, Cross et al., 2007). For example, the American Physicians Committee for Responsible Medicine (2011) estimates that in US the livestock sector is the biggest beneficiary of government food subsidies, directly receiving 63% and indirectly benefiting from the 20% grain subsidies. By comparison, the fruit and vegetables sector receives less than 1% and the nuts and legumes sector less than 2% of government food subsidies.

In countries such as Australia and US, there is also subsidisation through diesel excise. While this applies to both crops and livestock, the disproportionate energy used in livestock production effectively means far greater subsidisation by government. These politically entrenched subsidies are perpetuating the misinformation about the nutritional importance of increasing meat consumption.

In further support of livestock farmers, legislation and regulations reflect the priorities of mass production and consumption. Domestic animals are protected (to a degree) in law, but there are no laws defending food animals or people from the inherent cruelty of industrial farming (Safran Foer, 2009; Voiceless, 2012).

If information about the true cost of livestock were available, current subsidies would be revealed as endangering the wellbeing of the planet and human health.

Health Research, Practice and Nutritional Guidance

It was already reported in 1961 that a vegetarian diet could prevent 90-97% of heart and other non-communicable diseases and many called for a return to a more "traditional" plant-based diet for environmental, social and health reasons (Lappé, 1991). Yet, despite years of credible conclusive findings showing the disturbing health and environmental impacts of excessive meat consumption, and the benefits of plant-based diets, the science continues to be concealed behind political and food industry propaganda and vested interests (Moritz, 2009; Safran Foer, 2009).

For example, the original 1956 US food guide pyramid today still promotes the importance of a high animal protein diet. In 2011, the US Government replaced the graphics of MyPyramid with MyPlate – an "easy to understand visual cue to help consumers adopt healthy eating habits" (USDA, 2011: n.p.). "Unfortunately, like the earlier US Department of Agriculture Pyramids, MyPlate mixes science with the influence of powerful agricultural interests, which is not the recipe for healthy eating" (Willet cited in Harvard School of Public Health, 2011:n.p.). In response, the Harvard University School of Public Health unveiled a Healthy Eating Plate which specifically emphasises "healthy proteins" such as nuts and beans and recommends limiting "red meat and avoiding processed meats, since eating even small quantities of these on a regular basis raises the risk of heart disease, type 2 diabetes, colon cancer, and weight gain" (Harvard School of Public Health, 2011:n.p.).

In Australia, in 2005 the CSIRO released "The CSIRO Total Wellbeing Diet" (TWD) which is based almost entirely on red meat consumption (Noakes & Clifton, 2005). The MLA funded some of the CSIRO's research into

the TWD. The then Australian Prime Minister promoted TWD with a mail-out to over 2 million school children. This highlights the blurred lines between political, industry and public health interests. Another example of duplicity is the MLA's "expert panel" to investigate the link between red meat and bowel cancer. The National Health and Medical Research Council of Australia (NHMRC), the designated government body for health advice, cited the MLA's findings in the 2003 Australian Dietary Guidelines without informing the public who had conducted the research or the conflict of interest of the panel (Russel, 2009).

The medical profession and the health insurance sector are typically not equipped to question the reliability of such information. Doctors and nurses receive little or no training in nutrition (Stone, 2011). Meat is also part of daily dietary recommendations suggested by the health and wellbeing industry, including weight loss programs (such as Weight Watchers International Inc.).

Despite conclusive evidence of the harmful health and destructive environmental implications of excessive meat consumption and the benefits, at all life stages, of a plant-based diet (Campbell & Campbell, 2006; Stone, 2011), people continue to be told that the more meat they eat, the healthier they will be (Bittman, 2007; Simon, n.d.). In the face of such a pervasive misinformation, even those looking to make the right food choices face a difficult task.

Homogenisation of Diets

The global nutrition transition towards diets of more meat, less complex carbohydrates and reduced fruit and vegetable intakes has been encouraged around the world by the western cultural hegemony: if you are rich, you eat meat, and if you are poor, you eat staple plant food like potatoes and bread (Campbell & Campbell, 2006). These increasingly dominating food trends are not simply a matter of taste, or elitism. Essentially, globalisation, harmonisation of food standards, retailer and wholesaler consortium domination, mass marketing and advertising and the erroneous

belief that the western-style diet is the best, are leading to a rapid worldwide adoption of high meat consumption (Campbell & Campbell, 2006; Goodland, 2001). Poor and emerging economies are regarded as new and growing markets. They are expected to generate the biggest increases in meat consumption over the next 45 years (Elam, 2006). Where acknowledgement is made to the role of diet, such as in the projected cancer growth statistics – 75% by 2030 with over 90% of these in developing countries (Bray et al., 2012), no explicit attention is given to preventative nutritional strategies or mitigatory interventions that avoid propagation of the western food model. It seems morally inappropriate to combat diseases of poverty in ways that cause diseases of affluence.

Meat consumption is also promoted to the socially disadvantaged within society, for example as part of school feeding programs and food assistance in impoverished areas, including charity initiatives (e.g. sausage sizzles). The result is an increasingly sick population and a real possibility that today's children will have shorter life expectancies than their parents. They will also inherit a world of scarcity, ill health, hardship and suffering (Stone, 2011). Some commentators claim that similarly to peak oil, humanity has already attained peak health, namely "the point in time when the maximum rate of health care delivery is reached, after which further demand ensures terminal decline in standards of health" (Judge, 2008). However, unlike peak oil, health need not be a finite resource and may exist in abundance through a shift in the current nutritional trajectory.

More information appears to be urgently needed in order to allow people to reaffirm their own traditional diets and forego the western experience of expensive morbidity and mortality associated with meat-rich diets. However, this change will not happen as long as meat continues to be promoted as a healthy, necessary food source (USDA, 2012; Australian Healthy Food Guide, 2012; Russel, 2009). Informed individuals and communities should hopefully be able to make a shift away from the current food paradigm and look for healthier alternatives.

Flexitarianism and Information

Given the health and environmental impacts of excessive meat consumption, there is a lucid need for urgent dietary reform. Potentially less harmful food choices and options should be easily and immediately accessible for as many people as possible. There are numerous dietary options that avoid red meat altogether, including: veganism, vegetarianism, pescatarianism, fruitarianism and macrobiotic diets. However, these all require significant changes and fundamental nutritional commitments for those accustomed to regular meat consumption. An alternative approach that allows for almost instantly beneficial yet gradual, incremental and progressive advances is flexitarianism. Despite being voted the most useful word of 2003 by the American Dialect Society (2004), the term is still infrequently used. Its definitions vary to include semi-, part-time, partly or flexible vegetarianism (Hirsch, 2004; Berley, 2007) or meat-reducers. The way the word is intended in this article is to describe a dietary shift towards increasing the vegetarian component in personal diets and gradually reducing meat consumption. According to Raphaely and Marinova (2012), flexitarianism encourages people to substitute meat with plant-based foods. Although the more the better, the level of meat reduction chosen through adopting a flexitarian diet is a matter of personal choice.

Personal choices about how much to reduce one's meat consumption may be informed by reputable global medical research bodies with no other apparent vested interests than human health. Recent recommendations by the World Cancer Research Fund (WCRF), the American Institute of Cancer Research (AICR), the Harvard School of Public Health, and the Oxford European Prospective Investigation into Cancer (EPIC) study suggest that meat consumption should be limited to a maximum of 500 g a week or 26 kg per year. This recommendation is now endorsed by the UK Government (Campbell & Campbell, 2006; WCRF/AICR, 2007; Harvard School of Public Health, 2011:n.p.; Campbell, 2011). A similar consideration (i.e. a limit of

455 g of lean meat per week) is included in the current Australian dietary guidelines (National Health and Medical Research Council, 2013) in light of increasing scientific supports for predominantly plant-based diets (Stanton, 2012; Marsh et al., 2012; Saunders et al., 2012 a, b and c; Zeuschner et al., 2012; Reid et al., 2012; Radd and Marsh, 2012). Further, recommendations suggest that processed meat products, such as bacon, ham, salami, sausages, deli meats and some hamburgers should not be consumed at all (Harvard School of Public Health, 2011:n.p.). However, for populations in many countries current levels of per capita meat consumption are drastically different from these recommendations (see Table 1).

Flexitarianism is an individual journey which may be difficult for some in light of the current dominant nutritional discourse, misrepresentation and misinformation regarding the value of meat-rich diets. A population transition towards decreasing meat consumption should be supported by targeted public, private and community-based health initiatives. Through education and information, people should be assisted to make good dietary choices for better nutrition (FAO, 2013). To facilitate and encourage such a broad-based change, a number of public health information initiatives and partnerships are proposed below:

1. Publicly available and easily accessible government nutritional recommendations based on trustworthy research – government-based nutritional recommendations which rise above industry interests could encourage people to eat less meat and more plant based protein sources;
2. Targeted information distribution and campaigns for reducing meat consumption, particularly in high-risk groups or populations vulnerable to misinformation from the meat industry – parallels can be drawn with anti-smoking, anti-drinking, SunSmart and healthy lifestyle campaigns and other initiatives which promote healthier choices;
3. Web- and telephone-based public and private health information services (e.g. health

Table 1. Meat consumption: recommended and selected countries [per capita], 2009

	Per Capita Average Annual Consumption (kg)	Per Capita Average Weekly Consumption (kg)	Per Capita Average Daily Consumption (g)
Recommended*	<26.0	<0.500	<71
USA	120.2	2.312	330
Australia	111.5	2.144	306
Luxembourg	107.9	2.075	296
Argentina	98.3	1.890	270
Spain	97.0	1.865	266
Canada	94.3	1.813	259
Denmark	95.2	1.831	261
Italy	90.7	1.744	249
Germany	88.1	1.694	242
France	86.7	1.667	238
Brazil	85.3	1.640	234
United Kingdom	84.2	1.619	231
Greece	74.8	1.438	205
United Arab Emirates	73.8	1.419	203
Mexico	63.8	1.227	175
Russia	62.9	1.210	173
South Africa	58.6	1.127	161
China	58.2	1.119	160
Saudi Arabia	54.4	1.046	149
South Korea	54.1	1.040	149
Bulgaria	53.0	1.019	146
Malaysia	52.3	1.006	144
Cuba	49.4	0.950	136
Japan	45.9	0.883	126
Libya	33.5	0.644	92
Burma	32.1	0.617	88
Morocco	30.1	0.579	83
Egypt	25.6	0.492	70
Turkey	25.3	0.487	70
Peru	20.8	0.400	57
Pakistan	14.7	0.283	40
Indonesia	13.6	0.262	37
Congo	13.4	0.258	37
North Korea	13.4	0.258	37

continued on following page

Table 1. Continued

	Per Capita Average Annual Consumption (kg)	Per Capita Average Weekly Consumption (kg)	Per Capita Average Daily Consumption (g)
Malawi	8.3	0.160	23
Rwanda	6.5	0.125	18
Sri Lanka	6.3	0.121	17
India	4.4	0.085	12
Bangladesh	4.0	0.077	11
Global	41.9	0.806	115
* WCRF (2011a) recommends for health reasons that, if included in the diet, maximum personal consumption of meat should not exceed 0.5kg per week (26kg per annum). This recommendation is adopted among others by AICR, the UK government and the National Health and Medical Research Council of Australia.			

Source: Compiled from <http://faostat.fao.org/site/610/DesktopDefault.aspx?PageID=610#ancor> (accessed 1 September 2012)

- lines or HealthDirect in Australia) should provide easily accessible, widely available and transparent information on the health benefits of reduced meat consumption as part of their healthcare triage, health advice and health information services;
4. Health funds incentives – like automobile or household insurance bonuses or incentives geared towards attracting those less likely to make big claims, health funds could offer a sliding scale of incentives to those who consume less than 26 kg meat per year. These funds could also distribute information to support these incentives, including facts and figures about the numerous diseases associated with excessive meat consumption and the financial and resource drain this has on healthcare systems;
 5. Building government-industry-community-NGOs partnerships that encourage flexitarianism – supportive incentives and funding (such as tax concessions and superfund bonuses) could be given to such partnerships for promoting meat substitutes and plant-based alternatives;
 6. Government health department led informative and educative labelling of food – similar to cigarettes (e.g. smoking is a danger to your health), meat labelling could be introduced and the consumer provided with information about the true environmental and health costs of meat production and consumption. For example, packaged meat could disclose information about GHG generated, grain and water required per kg of the final product. In addition, advice to “enjoy responsibly”, “meat-wise” or maximum daily limits as part of a balanced healthy and sustainable diet, could be included on packages and in advertisements;
 7. Publicise successful flexitarian initiatives to mainstream meat reduction and create a sense of global community responsibility and practice – for example, prominent individuals (e.g. Nobel Peace Prize winner and chair of IPCC Dr Pachauri) have called for weekly meat-free days to reduce anthropogenic climate change and improve human health. The city councils of Cape Town (South Africa), Sao Paulo (Brazil), Bremen (Germany), Mechelen, Ghent and Hasselt (Belgium) have already officially endorsed one meat free day a week taking the lead in encouraging flexitarianism. Another example is Europe’s “Meat Reducers” movement with millions of participants part-fuelled by the global mad-cow scare. Tim Lang, Professor of food policy at City University in London and advisor to the

World Health Organisation recommends eating meat one day a week or on special occasions, i.e. meat as a treat, offering another illustration of promoting a flexitarian diet;

8. Include flexitarian messages in general health messages (together with messages such as walk, cycle, exercise, stay connected to your community) for all stages of life;
9. Include wide range of vegetarian options in mainstream media, such as magazine and newspaper lifestyle sections, TV cooking programs and series – this will encourage people to experiment with new meat-free options and possibilities. A flexitarian celebrity chef could be wisely used to spread the message;
10. Flexitarianism could be promoted through menus at public and private events and facilities, such as conferences, workshops, launches, canteens, cafeterias and restaurants in hospitals, schools, sporting facilities and other public venues – this could be done through public-private partnerships and collaboration. Tourist initiatives such as “veggie street maps” highlighting and promoting eateries and venues that offer meat-free choices (Mason, 2009) can also be part of such partnerships.

A major aspect of the flexitarianism transformation is related to the role and influence of the health profession itself. Equipped with the necessary research evidence, medical practitioners and healthcare providers should educate, support and encourage individuals in their striving for better health. In the name of medical integrity these professionals should feel compelled to advise against food that is bad for health, as in the case of excessive meat consumption. After all, doctors still take their Hippocratic Oath whose original classic version states: “I will use those dietary regimens which will benefit my patients according to my greatest ability and judgment, and I will do no harm or injustice to them” (North, 2002).

Health Benefits of Flexitarianism

Broad-scale adoption of flexitarianism is a win-win health proposal with individuals, local and global populations standing to benefit from the direct and indirect positive outcomes. Currently there is a striking food paradox in the world with 1.3 billion people overweight or obese and 1 billion starving. Further, 20% of the world population continues to consume 80% of the global food produced (including the grains consumed by meat animals). The dominant global food system has to date been primarily directed towards increasing the amount of calories available without too much consideration of the health impact. The western meat-rich diet, in dislocating traditional diets, has resulted directly and indirectly in a full-blown global health emergency (De Schutter, 2012).

According to De Schutter (2012: n.p.), it is this “food system itself that is making people sick”. In 2012 the Health Professionals (1986-2008) and Nurses’ Health (1980-2008) follow-up studies of 3 million person-years confirmed that “[r]ed meat consumption is associated with an increased risk of total, CVD [cardiovascular disease], and cancer mortality. Substitution of other healthy protein sources for red meat is associated with a lower mortality risk”, namely 7-19% lower premature overall mortality risk and 9.3% preventable deaths for men and 7.6% for women if all of these individuals consumed less than 0.5 servings per day (approximately 42 g per day) of red meat (Pan et al., 2012: 555). Flexitarianism calls for such reduction in meat consumption through substitution with alternative healthy protein choices.

Food security through cheap meat production and availability is unsustainable. It is neither nutritionally sound nor ecologically viable. Changes in the dominant political and economic systems are unlikely to occur fast enough to address and mitigate the growing human and environmental health crisis. Flexitarianism has the potential to address this emergency with immediate results. At the same time as the current forces of politics and profit may resent and resist

such a change, there is compelling evidence that the adoption of more sustainable alternatives holds a lot of opportunity and in fact, may be essential for planetary and economic wellbeing (Stern, 2006; Garnaut, 2008 and 2011).

It is encouraging to know that just 25% reduction in global meat consumption will achieve a 12.5% reduction in GHG emissions, the same target delegates tried, but failed to achieve at the 15th Conference of the Parties (COP15) of the United Nations Framework Convention on Climate Change (UNFCCC) in Copenhagen in 2010. It is estimated that halting climate change (i.e. stabilising atmospheric CO₂ at 450ppm) will cost US\$ 40 trillion by 2050; a worldwide shift from 2010-2030 to a low-meat diet would reduce this cost by more than 50% (Stehfest et al., 2009).

It is not important by how much an individual starts reducing their meat consumption, as any reduction has immediate personal and global health and environmental benefits. The immediate personal, population and environmental benefits include among others:

- Decrease in nutrition-related chronic and non-communicable diseases.
- Decreased mortality.
- Preventing nutrition related personal and public health costs due to excessive meat consumption.
- Slowing the alarming biodiversity loss with ongoing human health and biophysical gains.
- Decreases in GHG emissions and livestock induced climate change.
- Improved environmental health, including decreases in water and land pollution.
- Arresting further livestock-related deforestation and freeing up agricultural land and water resources.
- Freeing grain for direct human consumption.

Widespread personal adoption of flexitarianism in western and emerging economies holds

a key to increasing wellbeing and improving population health. Essentially a high-meat and low-plant diet perpetuates high health inequalities and lower average health status at any level, while high-plant and low-meat diet immediately contributes towards decreasing health inequalities and increasing health and wellbeing, both individual and average, thus improving population health. In Table 2, the contribution of the information policy interventions proposed in this paper are assessed against their impact on key stakeholders and their overall value for public health and environmental wellbeing. The methodology used in this analysis (see Panayotov, 2008, 2010) allows for a general and quick overview of the “winners” and “losers” illustrating the net benefit of increasingly available information leading to promotion and adoption of flexitarianism.

Without any of the suggested information policies, there are more *losers* than *winners* and the *winners* are heavily skewed against public health. The assessment shows that after intervention, the net benefit is significant with overwhelmingly more *winners* than *losers*. In every case illustrated without intervention, excessive meat consumption continues and the average health status is likely to continue to deteriorate, as is health inequality. Without exception the average health status improves and the health inequalities decrease after these policy interventions. It is thus clear that information leading to increasing uptake of flexitarianism is likely to have an overall significant positive net gain for individual and public health.

In fact, consistently the only possible *losers* from all policy initiatives are the livestock and pharmaceutical stakeholders. Given the recent historic and current economic and political power wielded by these players, any public health information policy about increasing flexitarianism is likely to be met with resistance and counterclaims. It is therefore necessary to empower consumers and related government and industry nutritional bodies to understand the

Table 2. Assessment of proposed policies

	New business opportunities										Lower socio-economic communities				Bio physical world		Average Health Status	Health Inequalities
	Livestock industry	Agronomy	Pharmaceuticals	Research	Political parties	Government	Media, including the web	Public health	Individual consumers	Developed countries	Emerging countries							
1. Government pre post	W	W	W	W	W	L	W	L	L	L	L				L		→	→
2. Targeted pre post	L	W	L	W	W	W	W	W	L	W	W				W		→	→
3. Web- and post	W	W	W	W	W	W	W	W	L	L	L				W		→	→
4. Health funds pre post	W	W	L	W	W	W	W	W	W	W	W				L		→	→
5. Partnershi pre post	W	W	W	W	W	L	W	W	L	L	L				L		→	→
6. Food labelling pre post	W	W	W	n/a	n/a	L	n/a	L	L	L	L				W		→	→
7. Publicise successful pre post	W	W	W	n/a	n/a	W	n/a	L	L	L	L				W		→	→
8. Flexitarian pre post	W	W	W	n/a	n/a	n/a	n/a	L	L	L	L				W		→	→
9. Mainstream pre post	L	W	W	n/a	W	W	W	W	W	W	W				W		→	→
10. Flexitarian pre post	W	W	W	n/a	W	W	W	L	L	L	L				W		→	→
	L	W	L	W	W	W	W	W	W	W	W				W		→	→

W - winner; L - loser; n/a - not applicable

health and planetary consequences of excessive meat consumption and allow for an informed user-driven health transformation.

CONCLUSION

There are vast cultural, religious, taste, nutritional, class and gender based influences on people's attitudes to food. In these, meat is often a major point of difference. Irrespective of this, meat consumption is on the increase across the globe. The resulting actual and predicted negative health outcomes from meat-derived nutrients are alarming. They include the consequences of unchecked use of antibiotics, meat processing methods, animal husbandry practices, mental health considerations as well as the indirect health impacts of climate change, biodiversity loss, land and water degradation and pollution.

Is meat bad for human health? According to Omish (2012: 563): "In a word, yes". Is meat bad for planetary wellbeing? Again, the short answer is "yes". All scientific evidence shows that everyone and everything in the world will benefit from a global reduction in meat consumption. Yet despite some positive indication of a shift in the right direction, the dominant trend of ever-increasing excessive meat consumption remains unchanged and the health of populations as well as the planetary prospects appear bleak.

Information offering individuals the ability to make a significant difference to their own future is the most powerful source of potential human and closely related environmental redemption. However this personal journey may be undermined by the dominant meat-rich nutritional discourse and the ongoing misrepresentation of the benefits of a meat-based diet. The policies outlined in this paper may serve to counter this and in so doing, facilitate a growing awareness, individual and community empowerment, and ultimately a transition to healthier food choices. There are no downsides to such a transformation as the assessment of the rec-

ommended policies shows. The only potential losers would be livestock and pharmaceutical stakeholders, if they continue to resist the imperative for change. If they do recognise the proven unsustainability of their business practices, there is vast opportunity in developing and marketing alternative healthier food products, including meat analogues. Flexitarianism, supported by sound information dissemination and policy strategies, creates abundant favourable conditions for many new and exciting dietary, human and planetary wellbeing initiatives.

Excessive meat consumption is at the core of the most challenging social and environmental problems we currently face. Although reducing animal protein intake in people's diets offers an immediately accessible solution, vested interests of political and industry stakeholders supporting the global livestock sector may continue to stifle the debate. The appropriate policies may not be put in place straight away or fast enough. With profit being prioritised over people and the planet, hope lies in the potential of informed individuals to arrest the seemingly inevitable ecological and human decline by making more sustainable and healthy user-based dietary choices. As such flexitarianism offers a substantial opportunity for improving personal, population and environmental wellbeing.

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